

ABSTRACT OF THE DISCLOSURE

A desulfurization unit is provided. In one embodiment, the present desulfurization unit comprises: a first adsorbent bed having an inlet for receiving a hydrocarbon fuel stream and comprising an adsorbent selected from the group consisting of metal oxides and zeolites; a downstream nickel adsorbent bed; and a downstream guard bed comprising an adsorbent selected from the group consisting of copper-zinc adsorbents, activated alumina, activated carbon, and zeolites. Processes for desulfurizing hydrocarbon fuel streams employing the present desulfurization unit are provided. Fuel cell electric power generation systems employing the present desulfurization unit are also provided.